

گام‌ها:

یک. ساختمان مسکونی یا صنعتی می تواند انتخاب گردد

دو. حداقل تعداد طبقات ساختمان مسکونی بایستی ۴ طبقه و حداقل مساحت پلان ۱۸۰ متر مربع باشد

سه. پروژه شامل: (۱) تحلیل سازه، (۲) طراحی اعضای اصلی اسکلت فولادی و (۳) طراحی جزییات فولادی (اتصالات و غیره) می گردد

چهار. برای تحلیل سازه و طراحی اعضای اصلی (تیر، ستون، مهار و غیره) استفاده از نرم افزار آزاد است (بطور مثال SAP یا ETABS)

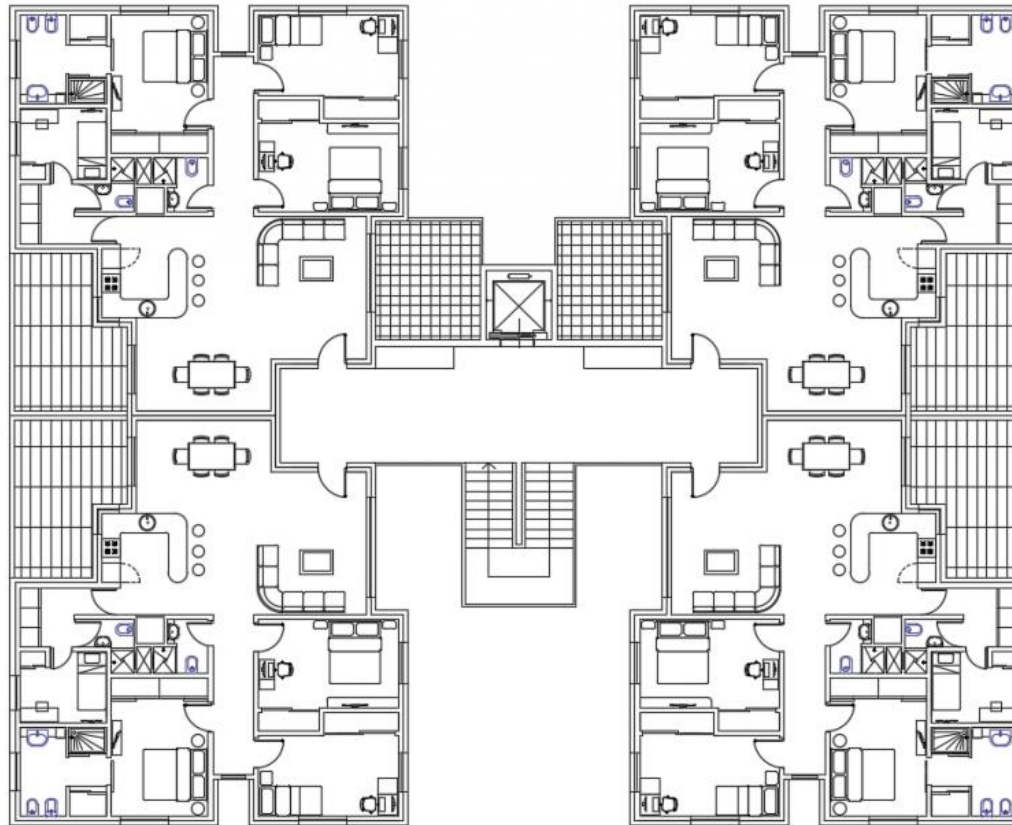
پنج. می توانید پروژه را در بصورت یک نفره یا در گروه دو نفره انجام دهید

شش. می توانید پروژه را انتخاب و برای تایید برای من بفرستید. در صورت پیدا نکردن پروژه، لطفاً اطلاع دهید تا یک پروژه برای شما ارسال کنم

هفت. تحویل پروژه شامل تحویل پلان های سازه، فایل های تحلیل و طراحی (اسکلت، اتصالات و فونداسیون) و دفترچه محاسبات می گردد

یک. ساختمان مسکونی یا صنعتی می تواند انتخاب گردد

typical buildings plans (residential and office) / architectural

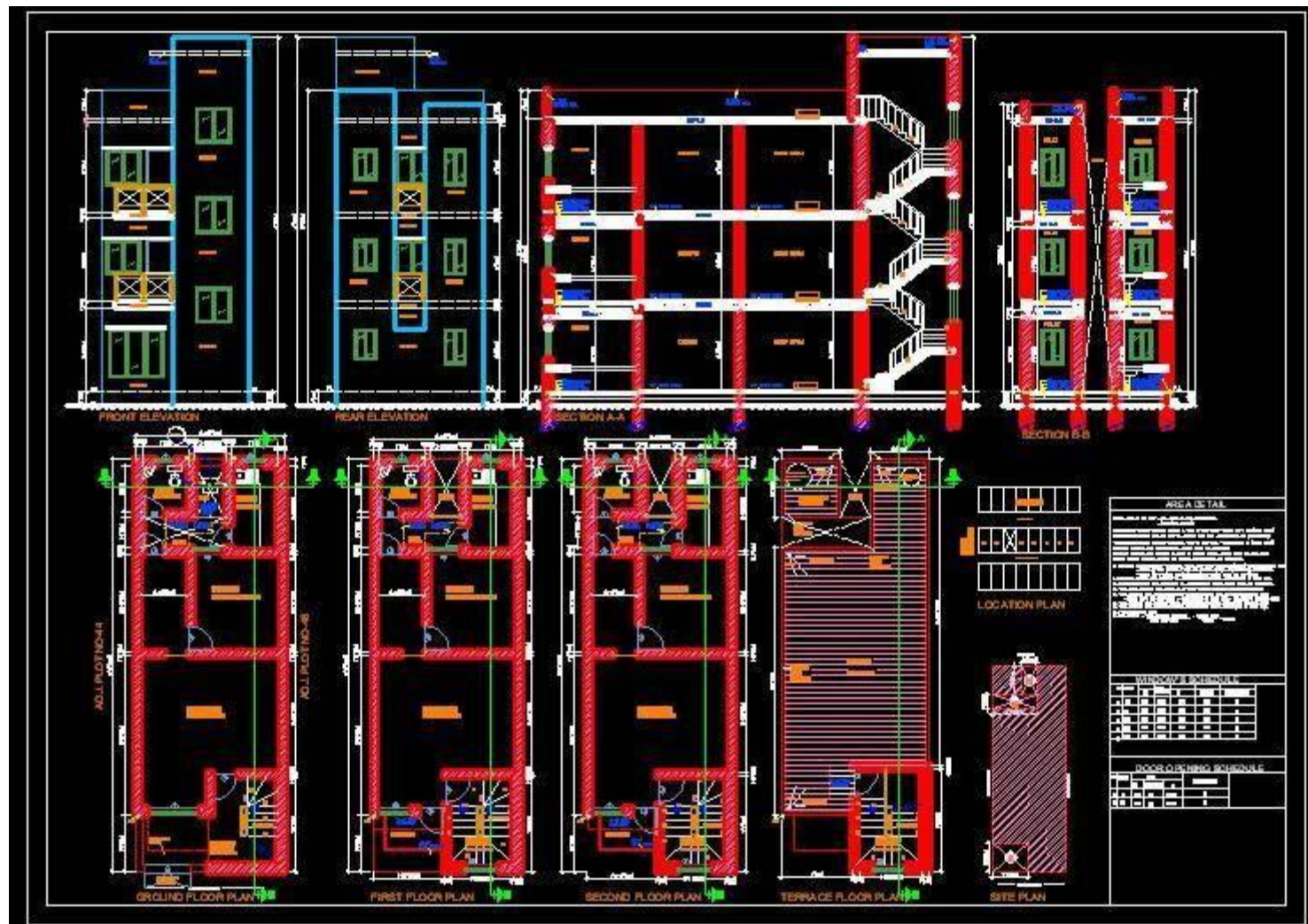




THIRD FLOOR PLAN

A ACCESS FLOORS	K KITCHEN	U LAUNDRY ROOM	S SALOON	T TERRACE
E ENTRANCE	D DINNING ROOM	G GUEST BEDROOM	B BEDROOM	C CLOSET
L LOBBY	R LIVING ROOM	M MASTER BEDROOM	H BATHROOM	W WC



buildings complete set of architectural drawings (residential and office)

Some industrial buildings (pipe racks, warehouses, turbine halls, reactor buildings, etc.)

(1)

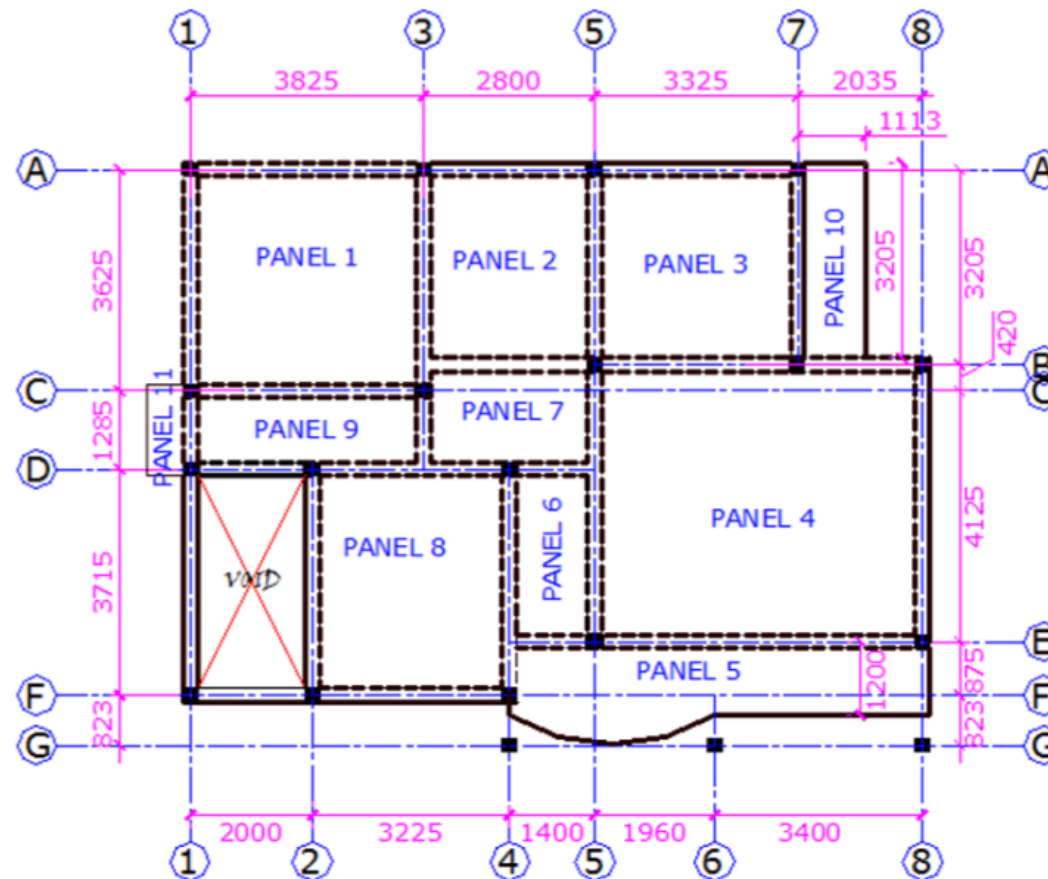
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(2)

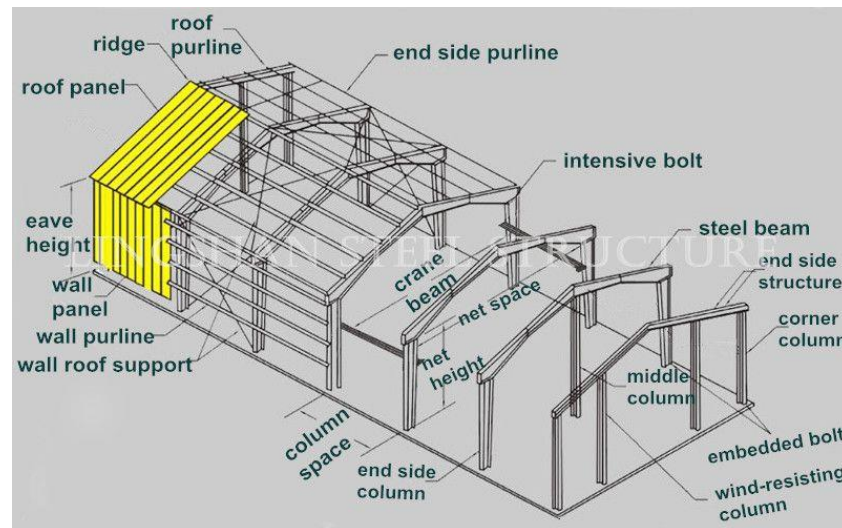
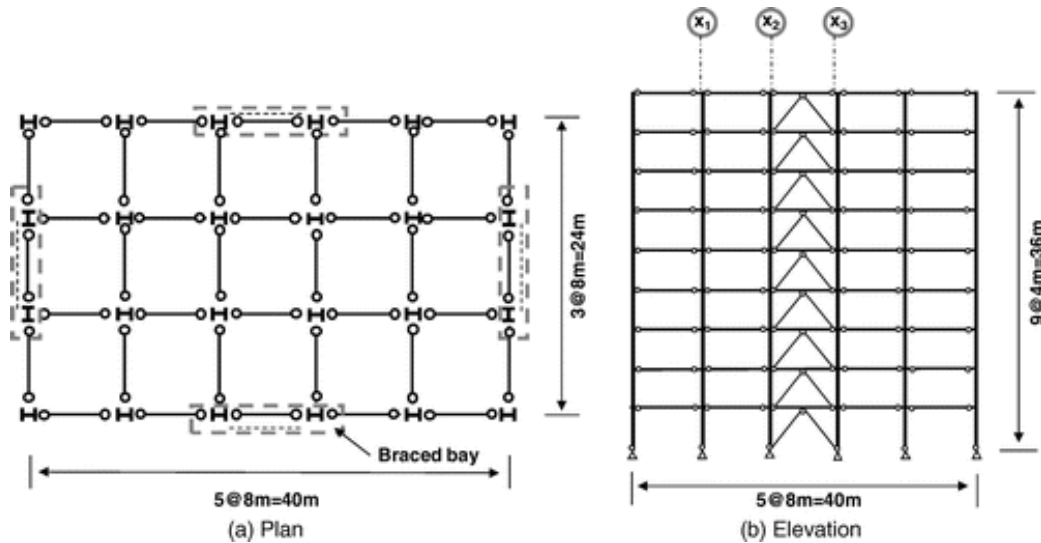
<file:///C:/Users/Lenovo/Desktop/bulletin%201.pdf>

دو. حداقل تعداد طبقات ساختمان مسکونی بایستی ۴ طبقه و حداقل مساحت پلان ۱۸۰ متر مربع باشد

Identify the location of columns and main beams (column and beam plan) and type of floors



Decide about the lateral-force resisting system for each principal direction (braced frame, moment frame, composite or a dual system)



سه. پروژه شامل: (۱) تحلیل سازه و طراحی اعضای اصلی اسکلت فولادی (شامل کنترل مقاومت و تغییر شکل)

(۲) طراحی جزییات فولادی (اتصالات و غیره) می گردد

Structural analysis and design (with a conventional software)

(1)

<https://www.csiamerica.com/>

(2)

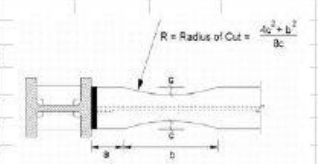
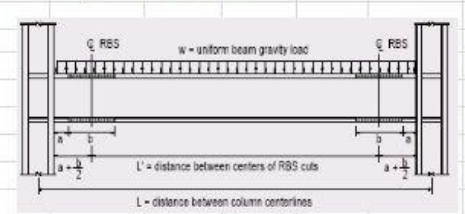
<https://www.csiamerica.com/products/etabs/releases>

Detail design Of Structural components (steel connections, etc.) with software such as Mathcad or Excel**Mathcad**<https://www.mathcad.com/en>**4.3 Design of bracing members:-****Connections:**

- Beam to column
(moment connection or simple)
- Beam to beam (simple)
- Braces to the frame
- Braces to the column baseplate

ARESCO		Design Calculation Sheet		ASEC		
TEBBIN		Design of Angles Subjected to Axial Force According to ECP No.(205)				
Project Title :		MISR BANI SUEF CAMPANY		Sheet No. :		
Department :		BOOSTER FAN PLATFORM & DUCT SUPPORT		Member ID : NB-03		
Tension = 0.00 ton		Grade of Steel : ST- 37		Case of Loading : I		
Compression = 2.46 ton		Kx = 1.0		Ky = 1.0		
Length = 2.66 m		L _x = 2.66 m		L _y = 2.66 m		
Thickness of Gusset Plate = 8 mm		Bolts : M12				
Type of Connection : Bolted		Section : 2Ls Back to Back		60x6		
Properties of Section : a = 60 mm t = 6 mm e = 1.69 cm Weight = 10.84 Kg/m I _x = 22.8 cm ⁴ I _y = 106.0 cm ⁴ ix = 1.82 cm Area = 13.82 cm ² iy = 2.77 cm A _{net} = 12.14 cm ²						
Check as Compression Member : Check Slenderness Ratio : $\lambda_x = 146.2 < 200$ SAFE $\lambda_y = 96.1 < 200$ SAFE Check Stress Ratio : Allowable Stress : $F_c = 0.351 \text{ t/cm}^2$ Actual Stress : $f_{ca} = 0.178 \text{ t/cm}^2 < F_c$ Stress Ratio = 0.51 SAFE			Check as Tension Member : Check Slenderness Ratio : $\lambda_x = 146.2 < 300$ SAFE $\lambda_y = 96.1 < 300$ SAFE Check Stress Ratio : Allowable Stress : $F_t = 1.392 \text{ t/cm}^2$ Actual Stress : $f_{ta} = 0.000 \text{ t/cm}^2 < F_t$ Stress Ratio = 0.00 SAFE			
Design of Bolted Connection : Bolts : M12 Grade of Bolts : 8.8 $\alpha = 0.8$ $t_{min} = 8 \text{ mm}$ Shear Strength : $R_{sh} = q_b \times A_s \times n = 3.36 \text{ ton}$ Bearing Strength : $R_b = F_b \times d \times t_{min} = 2.76 \text{ ton}$ No. of Bolts = 0.89 $\rightarrow$ 2 Bolts (S.R = 0.44)			Check of Shear Rapture : $q_s = 0.4 F_y = 0.96 \text{ t/cm}^2$ $A_{sh} = 4.32 \text{ cm}^2$ $F_u = 0.725 F_y = 1.74 \text{ t/cm}^2$ $A_t = 1.84 \text{ cm}^2$ $q_t \times A_{sh} + F_u \times A_t = 7.35 \text{ ton} > 2.5 \text{ ton}$ SAFE (S.R = 0.33)			
Section		Bolts	e	p	t _{G.P}	x
2Ls Back to Back 60x6		2M12(8.8)	25	50	8	30
1	-	-	-	-	-	-
0	Issued for Approval	AK	-	AM	-	HK
Rev.	Description	Design	Date	Checked	Date	Approved

Excel sheets

	A	B	C	D	E	F	G	H	I					
1	TYPICAL INTERIOR RBS: 2ND FLOOR TRANSVERSE													
2														
3		Column X		Column Y	Beam		F _y [ksi]	50						
4		Interior	Corner				F _{yc} [ksi]	55						
5		W14X211	W14X257	W14X211	W21X122		E [ksi]	29000						
6	Column Below:	W14X257												
7														
8	Section Properties	Column X		Column Y	Beam		w _y [klm]	0.0958						
9		Interior	Corner											
10	d	15.7	16.4	15.7	21.7									
11	b _f	15.8	16	15.8	12.4	LOCAL STABILITY CHECK								
12	t _w	0.98	1.18	0.98	0.6	(Flange & Web Slenderness)								
13	Z	390	487	390	307	0.3vE/F _y	7.22	(Flange)						
14	b _f /2t _f	5.06	4.23	5.06	6.45	2.45vE/F _y	59.00	Beam Web						
15	h/t _w	11.6	9.71	11.6	31.3	1.49vE/F _y	35.88	Column Web						
16	t _f	1.56	1.89	1.56	0.96									
17														
18	Beam Check			Column Check										
19	Connect to flange	OK		W36 or shallower	Column X		Column Y							
20	W36 or shallower	OK			Interior	Corner								
21	Max weight 300 lb/ft	OK		r	OK	OK	OK							
22	Min span/depth ratio = 7	OK												
23	Max t _f = 1-3/4"	OK												
24	Maximum Brace Spacing	12.14												
25	Panel Zone Thickness	OK												
26														
27	RBS Design (Transverse [X] Direction)													
28			Factor	Value										
29	a	(0.5 - 0.75)b _f	0.605	7.50										
30	b	(0.65 - 0.85)d	0.692	15.02										
31	c	≤ 0.25b _f	0.202	2.50										
32														
33	Column Face Moment Limit Check													
34	Beam t _f	0.96			Note: factors were selected to make a, b, and c even numbers that are easy to construct in the field									
35	Z _{max}	207.26												
36	M _{max} [k-in]	13109.00												
37	L' [in]	329.98												
38	V _{max} [k]	79.45												
39	V' _{max} [k]	75.65												
40	M _i [k-in]	14301.61												
41	M _i ' [k-in]	14244.48												
42	ΦM _{max}	16885.00												
43	M _i /M _{max}	0.85												
44														
45	Beam Shear Strength													
46	V _u [k]	80.89			AISC Seismic Section 7.4: No Shear Studs. No welded, bolted, screwed or shot-in attachments for perimeter edge angles, exterior facades, partitions, duct work, piping or other construction. Decking arc-spot welds are permitted.									
47	ΦV _u [k]	351.54												
48														
49	Strong Column - Weak Beam Check													
50		Above	Below											
51	P _u [k]	102.91	137.94											

TEKLA software

For the complete modeling of steel structures including all the steel members and connections (can model concrete)

(1)

<https://www.tekla.com/products/tekla-structures>

(2)

https://www.google.com/search?q=tekla+structures&sxsrf=ALeKk00_-4dqvXYiPpxZMPq2TX_DTgdjSw:1602053608359&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjY0vLh8qHsAhWFDuwKHfTOA74Q_AUoAXoECCMQAw&biw=1366&bih=625#imgsrc=s006s1c-ry5w7M&imgdii=L1HTOwH1Imdq-M

(3)

https://www.google.com/search?q=tekla+structures&tbm=isch&chips=q:tekla+structures,g_1:connection:sQAusYal8oE%3D&hl=en&sa=X&ved=2ahUKEwj88Jax9aHsAhUQgosKHZ_3BSqQ4IYoCHoECAEQJA&biw=1404&bih=663#imgsrc=OXHC8mtr4ttzMM&imgdii=V6pbNpZyUbTKWM

Limcon software (Bentley)

<https://www.bentley.com/en/products/product-line/structural-analysis-software/limcon>

هفت. تحویل پروژه شامل تحویل پلان های سازه، فایل های تحلیل و طراحی (فونداسیون، اسکلت و اتصالات)، و دفترچه محاسبات می گردد

